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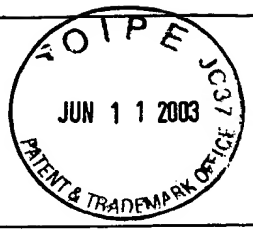

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

APPEAL BRIEF TRANSMITTAL		Docket Number: 10744/900	Conf. No. 9010
Application Number 09/824,167	Filing Date April 2, 2001	Examiner T. M. Dougherty	Art Unit 2834
Invention Title TIME-AND EVENT-CONTROLLED ACTIVATION SYSTEM FOR CHARGING AND DISCHARGING PIEZOELECTRIC ELEMENTS		Inventor RUEGER et al.	

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Date: June 9, 2003

Signature: [signature]

Further to the Notice of Appeal mailed December 20, 2002, for the above-referenced application, enclosed are three copies of an Appeal Brief. Accompanying the Appeal Brief is the Appendix to the Appeal Brief.

The Commissioner is hereby authorized to charge payment of the 37 C.F.R. § 1.17(c) appeal brief filing fee of $320.00, and any additional fees associated with this communication to the deposit account of **Kenyon & Kenyon**, deposit account number **11-0600**.

Applicants request a four month extension of time to respond to the Notice of Appeal mailed December 20, 2002, resetting the response date to June 20, 2003. The extension fee of $1,450.00 should be charged to the deposit account of **Kenyon & Kenyon**, deposit account number **11-0600**.

Dated: June 9, 2003

By: Richard L. Mayer Mary C. Mercer / Reg no 30,333
Richard L. Mayer (Reg. No. 22,490)

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26646
PATENT TRADEMARK OFFICE
KENYON & KENYON
One Broadway
New York, N.Y. 10004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	Examiner: Thomas M. DOUGHERTY
Johannes-Joerg RUEGER et al.	
For: TIME-AND EVENT-CONTROLLED SYSTEM FOR CHARGING AND DISCHARGING PIEZOELECTRIC ELEMENTS	
Filed: April 2, 2001	Art Unit 2834
Serial No.: 09/824,167	

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Date: 6/09/03

Signature: Damaris Quiroga

~~Richard L. Mayer (Reg. No. 22,490)~~

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P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF PURSUANT TO 37 C.F.R. § 1.192(a)

S I R:

In the above-identified patent application ("the present application"), Appellants mailed a Notice of Appeal on December 20, 2002 from the Final Office Action issued by the United States Patent and Trademark Office on July 25, 2002. In the Final Office Action, claims 1 to 17 and 19 to 38 were finally rejected. An Advisory Action was mailed on October 21, 2002.

In accordance with 37 C.F.R. § 1.192(a), this Appeal Brief is submitted in triplicate in support of the appeal of the final rejections of claims 1 to 17 and 19 to 38. For the reasons more fully set forth below, the final rejections of claims 1 to 17 and 19 to 38 should be reversed.

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1. REAL PARTY IN INTEREST

The real party in interest in the present appeal is Robert Bosch GmbH ("Bosch") of Stuttgart in the Federal Republic of Germany. Bosch is the assignee of the entire right, title and interest in the present application.

2. RELATED APPEALS AND INTERFERENCES

There are no interferences or other appeals "which directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal."

3. STATUS OF CLAIMS

Claims 1 to 17 and 19 to 38 stand finally rejected under 35 U.S.C. § 112, second paragraph as indefinite.

Claims 1 to 6, 8 to 17 and 19 to 38 stand finally rejected under 35 U.S.C. § 102(b) as anticipated by European Published Patent Application No. 0 871 230 ("Reineke et al.").

Claim 7 stands finally rejected under 35 U.S.C. § 103(a) as unpatentable over Reineke et al).

A copy of the appealed claims is attached hereto in the Appendix.

4. STATUS OF AMENDMENTS

In response to the Final Office Action issued on July 25, 2002, a Response Under 37 C.F.R. § 1.116 was filed on September 25, 2002.

5. SUMMARY OF THE INVENTION

The present invention relates to an apparatus and method for charging and discharging a piezoelectric element using an inductive element. Specification, page 1, lines 8 to 14.

According to an example embodiment of the apparatus and method of the present invention, a current is generated that can exhibit gaps and thus results in a lower average current. Specification page 25, lines 11 to 16.

According to the apparatus and method of the present invention, a certain time delay or predefined time can be defined such that when a certain event occurs, e.g., the current value hitting a value below a predefined lower current value or a value above a predefined higher current value, then the charge or discharge switch can remain off or on, respectively, until the time delay or predefined time elapses. Specification, page 25, lines 18 to 26. According to an example embodiment of the apparatus according to the present invention, a charge switch or discharge switch then switches on or off, respectively. Specification, page 25, lines 26 to 29. In a particular embodiment, when the measured current value reaches a value that is equal to or less than the predefined lower current value, then the predefined time begins to run. When the predefined time has elapsed, the charge switch switches from off to on. A desired average current can then be achieved by varying the time period. Specification, page 25, line 29 to page 26 , line 3.

According to alternative embodiments of the present invention, the apparatus controls switching based on both events (such as excursions above and below the current thresholds) and time. Specification, page 26, lines 6 to 9. In a first example embodiment of the present invention, a time delay is provided for switching the charge switch back on upon an excursion below the lower current threshold. In a particular embodiment, the lower current threshold can be zero. Specification, page 26, lines 11 to 20. In a second example embodiment of the present invention, the lower current threshold is omitted. Instead, a square-wave signal with a certain frequency is used to switch on the charge switch. It is switched off when the upper current threshold is exceeded. This guarantees that the maximum current that occurs cannot cause damage to the components. Specification, page 26, lines 22 to 28. In a third example embodiment of the present invention, the charge switch is switched back on in each case after a predefinable time following an excursion of current

above the upper current threshold. Specification, page 26, line 30 to page 27, line 1.

The apparatus and method for charging and discharging a piezoelectric element using an inductive element according to the present invention provides additional advantages. These different conditions for activation enable any desired variation in the activation time and activation current and can provide for gaps in the current, which thereby can contribute to a lower average current. Specification, page 27, lines 3 to 6. The time-and-event-controlled activation for piezoelectric elements or piezoactuators according to the present invention can be applied to a wider range of applications than purely event-controlled activation system. Additionally, depending on the embodiment and defined time and event characteristics, there may also be a cost advantage due to a less complex implementation of the apparatus in an activation IC. Specification, page 27, lines 8 to 16. Significantly, the apparatus and method of the present invention enables the implementation of freely selectable activation signals, greatly increasing the flexibility of the activation IC. Specification, page 27, lines 18 to 21.

Thus, the apparatus and method according to the present invention enable efficient charging and discharging of piezoelectric elements in a simple and elegant fashion in confined spaces by achieving arbitrarily low average currents during the charging and discharging of piezoelectric elements. Specification, page 28, lines 6 to 10.

6. ISSUES

1. Whether claims 1 to 17 and 19 to 38 are indefinite under 35 U.S.C. § 112, second paragraph.

2. Whether claims 1 to 6, 8 to 17 and 19 to 38 are anticipated under 35 U.S.C. § 102(b) by Reineke et al.

3. Whether claim 7 is unpatentable under 35 U.S.C. § 103(a) over Reineke et al.

7. GROUPING OF CLAIMS

Group 1: Claims 1 to 6, 8 to 17 and 19 to 38 stand or fall together.

Group 2: Claim 7.

Appellants respectfully submit that the claims of each Group stand or fall together with the other claims of that Group. However, each Group of claims does not stand or fall together with any other Group of claims.

8. ARGUMENTS

ISSUE 1

Claims 1 to 17 and 19 to 38 were rejected under 35 U.S.C. § 112, second paragraph as allegedly indefinite.

Independent apparatus claims 1 and 19 relate to charging or discharging a piezoelectric element. In this regard, independent claim 1 recites an apparatus characterized in that a current is regulated as a function of a time characteristic and an even characteristic to achieve an effective low average current. Independent claim 19 recites an apparatus comprising an arrangement configured to regulate a current as a function of a time characteristic and an event characteristic to achieve an effective low average current.

Independent method claims 12 and 31 relate to methods of charging or discharging a piezoelectric element. Independent claim 12 recites a method characterized in that a current of the system is regulated as a function of a time characteristic and an event characteristic to achieve an effective low average current. Independent claim 31 recites a method for charging a piezoelectric element in a system, comprising the step of regulating a current of the system as a function of a time characteristic and an event characteristic to achieve an effective low average current.

In the Final Office Action, it is asserted that "[t]he independent claims note the invention in terms of function with no structure except an apparatus which performs the function" and that "it [sic] is very broad and nearly

fails to provide enablement." Final Office Action at p. 3. In the "Response to Arguments" section, the Final Office Action further asserts that one of ordinary skill in the art would not "assume" that the claimed arrangement is different from that disclosed in Reineke et al., and that if the arrangement were different from Reineke et al., the best mode has not been disclosed.

As an initial matter, it is respectfully submitted that the Final Office Action has mixed separate issues by introducing enablement and best mode allegations, which are issues to be raised, if at all, under 35 U.S.C. § 112, first paragraph. Since the present rejection relates to definiteness under 35 U.S.C. § 112, second paragraph, the unsupported allegations concerning enablement and best mode are entirely irrelevant. The assertion that the claims are indefinite is inconsistent with the unsupported allegations that the claims are not enabled or that Appellants have failed to set forth a best mode since such conclusions rest upon an interpretation of the scope of these claims. The allegation that the scope of the claims is "very broad and nearly fail to provide enablement," undercuts the argument that the scope of these claims is indefinite, since a conclusion regarding the metes and bounds of the claims must have been achieved.

Appellants also dispute the conclusion, based upon a reading of Ex Parte Masham, 2 U.S.P.Q.2d 1647 (Bd. Of Pat. App. & Int. 1987), that the language of the rejected claims is simply a recitation of how the claimed arrangement is intended to be employed.

The test for indefiniteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. If the claim read in light of the specification reasonably apprises those skilled in the art of the scope of the invention, section 112 demands no more. Miles Labs., Inc. v. Shandon Inc., 997 F.2d 870, 875 (Fed. Cir. 1993). Furthermore, a claim should not be denied "solely because of the type of language used to define the subject matter for which patent protection is sought." In re

Swinehart, 439 F.2d 210, 212 n.4 (C.C.P.A. 1971). Accordingly, there is no support, either in the actual holdings of prior cases for the proposition that functional language, in and of itself, renders a claim improper.

Additionally, the decision in Ex Parte Masham upon which the Examiner relies pertained to a mixer structure which did not impose any structural limitations, in functional language or otherwise, which differentiated it from the prior art. Id. at 1647. Therefore, the invention at issue in Ex Parte Masham did "not undergo a metamorphosis to a new apparatus". Id. at 1648.

The essential inquiry pertaining to the definiteness requirement under 35 U.S.C. § 112 is "whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity." M.P.E.P. § 2173.02. Furthermore, "[d]efiniteness of claim language must be analyzed, not in a vacuum, but in light of[, inter alia, the] content of the particular application disclosure[and the] claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made." Id. Breadth of a claim is not to be equated with indefiniteness. In re Miller, 441 F.2d 689, 169 U.S.P.Q. 597 (C.C.P.A. 1971). Regardless of breadth, if the scope of the subject matter embraced by the claims is clear, and if an applicant has not otherwise indicated that it intends the invention to be of a scope different from that defined in the claims, then the claims comply with the definiteness requirements of 35 U.S.C. § 112, second paragraph. M.P.E.P. § 2173.04. Accordingly, the Final Office Action's continued reliance on the claims' alleged lack of structure and breadth is entirely without merit and contrary to well established precedent. Reversal of this rejection is therefore respectfully requested.

The specification clearly indicates changes made to the configuration of the apparatus in the embodiments described as follows:

> A first embodiment of the present invention provides, as an additional parameter, a time delay for switching the charge switch back on upon an excursion below the lower current threshold. In a special case, this lower current threshold can be zero as shown in Fig. 12. If this time period is set at zero, there is no change compared with the previous situation. Fig. 12 shows an example of the first embodiment of the present invention having a time of about 5 s and a lower current threshold at 0 A. Any desired average current can be achieved by varying the time period.
>
> A second embodiment of the present invention, as shown in Fig. 13, provides that the lower current threshold is omitted. Instead, a square-wave signal with a certain frequency is used to switch on the charge switch. It is switched off, as before, when the upper current threshold is exceeded. This guarantees that the maximum current that occurs cannot cause damage to the components.
>
> A third embodiment of the present invention, as shown in Fig. 14, provides that the charge switch is switched back on in each case after a predefinable time following the excursion above the upper current threshold.

(Specification, page 26, line 11 to page 27, line 1).

The quoted section clearly provides that both an event threshold and a time parameter are regulated, that is, one of ordinary skill in the art would understand that the values for these quantities are configured in the circuitry of the apparatus. Such configurational changes in values are structural changes that result in a metamorphosis, since the apparatus functions differently as a result of the configurational changes.

The Final Office Action also contends that "while the event and time characteristics are alluded to on page 25, there is no proper antecedent basis for the terms themselves found in the disclosure." Final Office Action at p. 3. Appellants note however, that "[t]here is no requirement that

the words in the claim must match those used in the specification disclosure" and that "Applicants are given a great deal of latitude in how they choose to define their invention so long as the terms and phrases used define the invention with a reasonable degree of clarity and precision." M.P.E.P. § 2173.05(f) (emphasis added).

Furthermore, the Final Office Action states that "[a]t least claim 4 notes the threshold and gap, which terms are not clearly understood in the context of the claims." Final Office Action at p. 3. However, the specification clearly indicates what these terms refer to at page 25, lines 11 to 16:

> In the present invention, instead of closing the charge switch 3 again after the current has fallen below the lower limit, and thus allowing the current to rise again, the activation system according to the present invention provided for generating, if necessary, a current that can exhibit gaps and thus results in a lower average current.

(Emphasis added). Once again, the Final Office Action appears to ignore the guidance provided by the Specification, and the conclusions regarding what the skilled practitioner would not understand are therefore arbitrary, rather than an informed analysis in view of what the Specification describes.

In view of the foregoing, it is respectfully submitted that the burden of demonstrating that one of ordinary skill in the art would not recognize the bounds of the scope of independent claims 1, 12, 19 and 31. Likewise, the Final Office Action has not sustained this burden with respect to independent claims 13, 35 and 37, for essentially the same reasons given with respect to claims 1, 12, 19 and 31. It is therefore respectfully submitted that independent claims 1, 12, 13, 19, 31, 35, 37 and dependent claims 2 to 10, which depend from claim 1, claims 14 to 17, which depend from claim 12, claims 20 to 30, which depend from claim 19, claims 32 to 34, which depend from claim 31, claim 36, which depends from claim 35, and claim 38, which depends from claim 37, fully comply with the requirements of 35 U.S.C. § 112, second

paragraph, and reversal of this rejection is respectfully requested.

Issue 2

Claims 1 to 6, 8 to 17 and 19 to 38 were finally rejected under 35 U.S.C. § 102(b) as anticipated by Reineke et al.

Appellants respectfully submit that Reineke et al. do not anticipate the present claims for at least the following reasons.

Independent claim 1 relates to an apparatus for charging or discharging a piezoelectric element, characterized in that a current is regulated as a function of a time characteristic and an event characteristic to achieve an effective low average current.

Reineke et al. purportedly concern a method and a device for charging and discharging a piezoelectric element, in which both the charging and discharging occur, at least partially, via the same inductive element. Referring to Figure 1 of Reineke et al., there is seen a charging/discharging circuit having a piezoelectric element 1. One of the terminals of the element 1 is connected to ground and the other terminal is connected to a first pole of a voltage source via a coil 2, charging switch 3, and diode 4, as well as to a second pole of the voltage source via the coil 2, discharging switch 5 and diode 6.

Piezoelectric element 1 is charged and discharged in a switch mode (i.e., a timed manner), so that the charging switch 3 and discharging switch 5 can be arbitrarily and repeatedly opened and closed during the charging and discharging process.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim."

Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). That is, the prior art must describe the elements arranged as required by the claims. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

As regards claim 1, it is respectfully submitted that Reineke et al. do not identically disclose each and every limitation of this claim. Specifically, Reineke et al. do not disclose that "a current is regulated as a function of a time characteristic and an event characteristic to achieve an effective low average current." As stated above, Reineke et al. describe a charging and a discharging procedure, in which the charging switch 3 and discharging switch 5 are arbitrarily and repeatedly opened and closed during the charging and discharging process, independent of current. Reineke et al. simply do not disclose any device, method, or arrangement for regulating current, much less regulating current "as a function of a time characteristic and an event characteristic to achieve an effective low average current," as recited in claim 1.

While at least one of the Figures of the present application illustrates circuitry that appears to be similar to circuitry illustrated in the Figures of Reineke et al., regardless of the apparent similarity, Reineke et al. simply do not anticipate the subject matter of **claim 1** since Reineke et al. do not identically disclose each and every limitation as set forth in **the claims**.

Appellants note that the Figures of the present application are a part of the disclosure, not the claims. As such, the Figures may be used only to help interpret the claims, not to define the metes and bounds of the claims. Thus, contrary to the assertions contained in the Final Office Action, Appellants do not "admit that their [F]igure 1 is their intended invention." Rather, the invention of the present application is set forth in **the claims**. Thus, the Final Office Action's conclusory assertion that the alleged

similarity of Figures necessarily renders the subject matter of the claims anticipated by Reineke et al. is entirely without merit and plainly ignores the fundamental requirement that **the claims** be measured against a cited reference in evaluating patentability. In particular, the allegation that "[Applicants] show the exact same invention as shown by [Reineke et al.], it logically follows that the arrangement and functionality are met by [Reineke et al.]" is without merit since neither the Figures of Reineke et al. nor the description of Reineke et al. identically discloses each and every limitation as set forth in the present **claims**.

As noted above, since, contrary to the statements contained in the Final Office Action, the claimed invention can be defined using functional language, and the Examiner has not demonstrated that the Figures, or the description, of Reineke et al. disclose all of the limitations of **the claims**, the burden of establishing a prima facie case of anticipation has not been satisfied.

Quite the contrary, Reineke et al. simply do not disclose, or even suggest, the subject matter of claim 1. As recited in claim 1, the charging and discharging currents are regulated "as a function of a time characteristic and an event characteristic to achieve an effective low average current." With respect to the circuit of Figure 1, for example, current regulation may be performed by opening and closing switches 3, 5, such that gaps are provided in the charging/discharging cycle when necessary to achieve the low average current. (See Specification, p. 9, line 27 to p. 10, line 3).

Although Reineke et al. appear to disclose a charging/discharging circuit in Figure 1, in which switches 3, 5 may be repetitively opened and closed, Reineke et al. do not disclose, illustrate, or otherwise state that these switches 3, 5 are controlled, such that a charging or discharging current is regulated "as a function of a time characteristic and an event characteristic to achieve an effective low average current," as recited in claim 1. That is, unlike

Reineke et al., which arbitrarily opens and closes switches 3, 5 to charge the piezoelectric element, claim 1, to the extent that this claim encompasses the subject matter illustrated in Figure 1, would require that the switches 3, 5 be configured to regulate current "as a function of a time characteristic and an event characteristic."

Appellants further note that the present rejection is apparently based on nothing more than a comparison of the figures of the present application with the figures of Reineke et al. Furthermore, Reineke et al. was published in **German**. There is no indication whether an English-language translation of the text of Reineke et al. was obtain. Appellants were not provided with an English-language translation of the cited Reineke et al. publication. While U.S. Patent No. 6,081,061, which is of record in the present application, claims foreign priority to the same application from which Reineke et al. claim priority, none of the claims of the present application were rejected based on U.S. Patent No. 6,081,061.

In summary, it is respectfully submitted that Reineke et al. do not disclose, or even suggest, all of the limitations of claim 1. It is therefore respectfully submitted that Reineke et al. do not anticipate claim 1.

As regards independent claims 12, 13, 19, 29, 31, and 35, these claims each recite regulating a current "as a function of a time characteristic and an event characteristic to achieve an effective low average current." As such, the arguments stated above with respect to claim 1 apply equally to these claims.

As regards independent claim 17, this claim relates to a method for charging or discharging a piezoelectric element, in which "definition is made, prior to charging or discharging, for an absolute value of the current for charging or discharging the piezoelectric element . . . as a function of a time characteristic of the fuel injection system."

As regards independent claim 37, this claim relates to a method for charging and discharging a piezoelectric element of a fuel injection system, comprising the steps of:

defining an absolute value of a current for one of charging and discharging the piezoelectric element as a function of a time characteristic of the fuel injection system; and one of charging and discharging the piezoelectric element after the defining step.

As stated above, Reineke et al. describe a charging and a discharging procedure, in which the charging switch 3 and discharging switch 5 are arbitrarily and repeatedly opened and closed during the charging and discharging process. However, Reineke et al. do not define an absolute value of current, much less define an absolute value of current "as a function of a time characteristic of the fuel injection system," as recited in claims 17 and 37.

For at least the foregoing reasons, it is respectfully submitted that Reineke et al. do not anticipate claims 1, 12, 13, 17, 19, 29, 31, 35, and 37. Furthermore, since claims 2 to 6 and 8 to 11 ultimately depend from claim 1, since claims 14 to 16 ultimately depend from claim 12, since claims 20 to 28 ultimately depend from claim 19, since claim 30 depends from claim 29, since claims 32 to 34 ultimately depend from claim 31, since claim 36 depends from claim 35, and since claim 38 depends from claim 37, it is respectfully submitted that Reineke et al. do not anticipate these dependent claims for at least the same reasons more fully set forth above.

Accordingly, it is requested that the rejection of claims 1 to 6, 8 to 17, and 19 to 38 under 35 U.S.C. § 102(b) be reversed.

Issue 3

Claim 7 was rejected under 35 U.S.C. § 103(a) as unpatentable over Reineke et al.

Claim 7 depends from claim 1 and therefore includes all of the limitations of claim 1. As more fully set forth above with respect to Issue 2, it is respectfully submitted that Reineke et al. do not disclose, or even suggest, that the current is regulated "as a function of a time characteristic

and an event characteristic to achieve an effective low average current," as recited in claim 1, from which claim 7 depends.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As indicated above, Reineke et al. do not disclose, or even suggest, the "current . . . regulated as a function of a time characteristic and an event characteristic to achieve an effective low average current," as recited in claim 1. It is therefore respectfully submitted that Reineke et al. do not render obvious claim 7, which depends from claim 1.

Moreover, it is respectfully submitted that the cases of In re Fine, supra, and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that the Final Office Action's generalized assertions that it would have been obvious to modify the reference do not properly support a § 103 rejection. It is respectfully submitted that those cases make plain that the Final Office Action reflects a subjective "obvious to try" standard, and therefore does not reflect the proper evidence to support an obviousness rejection based on the reference relied upon. In particular, the Court in the case of In re Fine stated that:

> The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. This it has not done. . . .
>
> **Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.**

In re Fine, 5 U.S.P.Q.2d at 1598 to 1600 (citations omitted; italics in original; emphasis added). Likewise, the Court in the case of In re Jones stated that:

> Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. . . .
>
> **Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].**

In re Jones, 21 U.S.P.Q.2d at 1943, 1944 (citations omitted; italics in original).

That is exactly the case here since it is believed and respectfully submitted that the Final Office Action offers no evidence whatsoever, but only conclusory hindsight, reconstruction and speculation, which these cases have indicated does not constitute evidence that will support a proper obviousness finding. Unsupported assertions are not evidence as to why a person having ordinary skill in the art would be motivated to modify or combine references to provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, the Office must provide

proper evidence of a motivation for modifying or combining the reference to provide the claimed subject matter.

More recently, the Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a "technologically simple concept" -- which is not the case here -- there still must be some finding as to the "specific understanding or principle within the knowledge of a skilled artisan" that would motivate a person having no knowledge of the claimed subject matter to "make the combination in the manner claimed," stating that:

> In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper prima facie case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Fed. Cir. 2000) (emphasis added). Again, it is believed that there have been no such findings.

The Final Office Action also contends that "[t]he shape of the signal is arbitrary however and is clearly equivalent to other types of signals that would perform the same function and which shape, is well within the skills of a routineer in the art to produce." Final Office Action at p. 6. Appellants dispute this assertion. The shape of the signal is not arbitrary as alleged by the Final Office Action. Moreover, the contention that the square-wave "is well within the skills of a routineer in the art to produce" is plainly indicative that the present rejection is improperly based on

speculation and an "obvious to try" rationale and cannot support an obviousness determination. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993) (a statement that modifications of the prior art to meet the claimed invention would have been well within the ordinary skill in the art at the time the claimed invention was made because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to established a prima facie case of obviousness without some objective reason to combine the teachings of the references).

Accordingly, there is no evidence that the reference relied upon, whether taken alone or modified, would provide the features and benefits of claim 7, which ultimately depends from claim 1. It is therefore respectfully submitted that claim 7 is patentable over Reineke et al. for these reasons. Appellants therefore request that the rejection of claim 7 under 35 U.S.C. § 103(a) be reversed.

9. CONCLUSION

For at least the reasons indicated above, Appellants respectfully submit that the art of record does not teach or suggest Appellants' invention as recited in the claims of the above-identified application. Accordingly, it is respectfully submitted that the invention recited in the claims of the present application is new, non-obvious and useful. Reversal of all of the rejections of the claims is therefore respectfully requested.

Respectfully submitted,

Richard L. Mayer

Dated: 6/9/03

By: Mary C. Werner, Reg No. 30,333
Richard L. Mayer
Reg. No. 22,490
KENYON & KENYON
One Broadway
New York, New York 10004
(212) 425-7200

APPENDIX

1. Apparatus for charging or discharging a piezoelectric elements, characterized in that a current is regulated as a function of a time characteristic and an even characteristic to achieve an effective low average current.

2. Apparatus for charging or discharging a piezoelectric element of a fuel injection system, characterized in that a current of the fuel injection system is regulated as a function of a time characteristic and an even characteristic to achieve an effective low average current.

3. Apparatus as according to claim 1, characterized in that the current is regulated by switching a charge or discharge switch (3, 5) as the function of the time characteristic and the event characteristic to achieve the effective low average current.

4. Apparatus as according to claim 1, characterized in that when the current is at a level below a predefined lower threshold, the charge switch remains open for a predefined time interval to allow the current to exhibit a gap.

5. Apparatus as according to claim 1, characterized in that a charge switch (3) or a discharge switch (5) of the apparatus is switched from an OFF position to an ON position or from the ON position to an OFF position, respectively to allow or stop charging or discharging when an absolute value of the current is respectively equal to or greater than or less than the event characteristic which is a predefined limit threshold current.

6. Apparatus as according to claim 1, characterized in that a charge or discharge switch (3, 5) of the apparatus is switched from the OFF position to the ON position to allow charging or discharging at a predefined time of the time

characteristic after the absolute value of the current is equal to or less than the event characteristic which is a predefined lower limit threshold current.

7. Apparatus as according to claim 1, characterized in that a square-wave signal of a certain frequency is used to switch a charge or discharge switch (3, 5) from an OFF position to an ON position to allow charging or discharging.

8. Apparatus as according to claim 1, characterized in that the charge or discharge switch (3, 5)is switched from the ON position to the OFF position when the absolute value of the current is equal to or greater than the event characteristic which is a predefined limit threshold current.

9. Apparatus as according to claim 1, characterized in that a desired average current is achieved by varying the time characteristic and the event characteristic.

10. Apparatus as according to claim 1, characterized in that a time delay is predefined so that the charge or the discharge switch is switched to the ON position according to the predefined time delay, the predefined time delay being set to trigger when the absolute value of the current equals or is greater than a predefined current threshold.

11. Apparatus as according to claim 1, characterized in that the current is not regulated within a current band and exhibits gaps.

12. Method for charging a piezoelectric element in a system , characterized in that a current of the system is regulated as a function of a time characteristic and an event characteristic to achieve an effective low average current.

13. Method for charging or discharging a piezoelectric element of a fuel injection system, characterized in that a

current of the fuel injection system is regulated as a function of a time characteristic and an event characteristic to achieve an effective low absolute average current.

14. Method as according to claim 12, characterized in that the charge or discharge switch (3, 5) of the system is switched from an OFF position to an ON position or from the ON position to an OFF position, respectively to allow or stop charging or discharging when an absolute value of the current is respectively equal to or greater than or less than the event characteristic which is a predefined limit threshold current.

15. Method as according to claim 12, characterized in that a charge or discharge switch (3, 5) of the system is switched from the OFF position to the ON position to allow charging or discharging at a predefined time of the time characteristic after the absolute value of the current is equal to or less than the event characteristic which is a predefined lower limit threshold current.

16. Method as according to claim 12, characterized in that a square-wave signal of a certain frequency is used to switch a charge or discharge switch (3, 5) from an OFF position to an ON position to allow charging or discharging and characterized in that the charge or discharge switch (3, 5)is switched from the ON position to the OFF position when the absolute value of the current is equal to or greater than the event characteristic which is a predefined upper limit threshold current.

17. Method for charging or discharging a piezoelectric element (1 and/or 11_1, 12_1, ... $1n_1$) of a fuel injection system, characterized in that a definition is made, prior to charging or discharging, for an absolute value of the current for charging or discharging the piezoelectric element (1 and/or

11_1, 12_1, ... $1n_1$) as a function of a time characteristic of the fuel injection system.

19. An apparatus for charging and discharging a piezoelectric element, comprising:

an arrangement configured to regulate a current as a function of a time characteristic and an event characteristic to achieve an effective low average current.

20. The apparatus according to claim 19, further comprising a charge switch and a discharge switch, the arrangement configured to switch the charge switch and the discharge switch as a function of the time characteristic and the event characteristic to achieve the effective low average current.

21. The apparatus according to claim 20, wherein the arrangement is configured to maintain the charge switch open for a predefined time interval to allow the current to exhibit a gap when the current is at a level below a predefined lower threshold.

22. The apparatus according to claim 20, wherein the event characteristic includes a predefined limit threshold current, the arrangement configured to switch the charge switch from an ON position to an OFF position to allow charging when an absolute value of the current is equal to or greater than the predefined limit threshold current and to switch the discharge switch from an ON position to an OFF position when the absolute value of the current is equal to or less than the predefined limit threshold current.

23. The apparatus according to claim 20, wherein the event characteristic includes a predefined lower limit threshold current, the arrangement configured to switch one of the charge switch and the discharge switch from an OFF position to an ON position and from an ON position to an OFF

position to respectively allow and stop charging and discharging at a predefined time of the time characteristic after an absolute value of the current is equal to or less than the predefined lower limit threshold current.

24. The apparatus according to claim 20, wherein the arrangement is configured to switch one of the charge switch and the discharge switch from an OFF position to an ON position to respectively allow charging and discharging in accordance with a square-wave signal having a predetermined frequency.

25. The apparatus according to claim 20, wherein the event characteristic includes a predefined limit threshold current, the arrangement configured to switch one of the charge switch and the discharge switch from an ON position to an OFF position when an absolute value of the current is equal to or greater than the predefined limit threshold current.

26. The apparatus according to claim 19, wherein the arrangement is configured to vary the time characteristic and the event characteristic to achieve a desired average current.

27. The apparatus according to claim 20, wherein the arrangement is configured to predefine a time delay and to switch the charge switch and the discharge switch to an ON position in accordance with the time delay, the arrangement configured to predefine the time delay to trigger when an absolute value of the current is equal to or greater than a predefined current threshold.

28. The apparatus according to claim 19, wherein the current is not regulated within a current band and exhibits gaps.

29. An apparatus for charging and discharging a piezoelectric element of a fuel injection system, comprising:

an arrangement configured to regulate a current of the fuel injection system as a function of a time characteristic and an event characteristic to achieve an effective low average current.

30. The apparatus according to claim 29, wherein the fuel injection system includes a double acting control valve.

31. A method for charging a piezoelectric element in a system, comprising the step of:

regulating a current of the system as a function of a time characteristic and an event characteristic to achieve an effective low average current.

32. The method according to claim 31, wherein the event characteristic includes a predefined limit threshold current, the regulating step including the substep of selectively switching one of a charge switch and a discharge switch one of from an ON position to an OFF position and from an OFF position to an ON position to one of allow and stop a respective one of charging and discharging when an absolute value of the current is respectively equal to or greater than or less than the predefined limit threshold current.

33. The method according to claim 32, wherein the event characteristic includes a predefined lower limit threshold current, the regulating step including the substep of switching one of the charge switch and the discharge switch from the OFF position to the ON position to respectively allow charging and discharging at a predefined time of the time characteristic after the absolute value of the current is equal to or less than the predefined lower limit threshold current.

34. The method according to claim 32, wherein the event characteristic includes a predefined upper limit threshold current, the regulating step including the substeps of:

switching one of the charge switch and the discharge switch from the OFF position to the ON position to respectively allow charging and discharging in accordance with a square-wave signal having a predetermined frequency; and

switching one of the charge switch and the discharge switch from the ON position to the OFF position when the absolute value of the current is equal to or greater than the predefined upper limit threshold current.

35. A method for charging and discharging a piezoelectric element of a fuel injection system, comprising the step of:

regulating a current of the fuel injection system as a function of a time characteristic and an event characteristic to achieve an effective low absolute average current.

36. The method according to claim 35, wherein the fuel injection system includes a double acting control valve.

37. A method for charging and discharging a piezoelectric element of a fuel injection system, comprising the steps of:

defining an absolute value of a current for one of charging and discharging the piezoelectric element as a function of a time characteristic of the fuel injection system; and

one of charging and discharging the piezoelectric element after the defining step.

38. The method according to claim 37, wherein the fuel injection system includes a double acting control valve.